

## CLAIMS

- 1    1.    A heads-up display system for an aircraft having a rotating propeller within view of at  
2        least one occupant of the aircraft, the heads-up display system comprising:  
3                a plurality of light-emitting elements disposed on a side of a propeller blade  
4        substantially facing at least one occupant of the aircraft; and  
5                a graphics generator controlling illumination of one or more of the light-emitting  
6        elements on the side of the propeller blade in accordance with the rotation of the  
7        propeller to produce at least one graphical image that appears to at least one occupant of  
8        the aircraft to be superimposed on a background.
- 1    2.    The heads-up display system of claim 1, wherein the at least one graphical image  
2        conforms to an object in the background upon which that graphical image is  
3        superimposed.
- 1    3.    The heads-up display system of claim 1, wherein one of the light-emitting elements,  
2        when illuminated, produces a narrow beam of light that is visible to each occupant within  
3        a radiation pattern of the light and is unseen by each occupant outside of the radiation  
4        pattern.
- 1    4.    The heads-up display system of claim 1, wherein one of the light-emitting elements,  
2        when illuminated, produces a wide beam of light visible simultaneously to multiple  
3        occupants of the aircraft with a view of the propeller.

- 1 5. The heads-up display system of claim 1, further comprising a data processor obtaining  
2 information from aircraft sensors and generating a command based on the information for  
3 use in generating the graphical image.
- 1 6. The heads-up display of claim 1, further comprising a communication channel between a  
2 processor in an airframe of the aircraft and the propeller for transferring signals between  
3 the processor and the graphics generator.
- 1 7. The heads-up display of claim 6, wherein the communication channel is a wireless  
2 channel.
- 1 8. The heads-up display of claim 6, wherein the communication channel is a wired channel.
- 1 9. The heads-up display of claim 8, wherein the communication channel includes a slip ring.
- 1 10. The heads-up display of claim 1, further comprising a processor translating electrical  
2 signals obtained from a sensor of the aircraft into a command to be sent to the graphics  
3 generator for producing the graphical image.
- 1 11. The heads-up display of claim 1, further comprising a power source supplying power to  
2 graphics generator.
- 1 12. The heads-up display of claim 11, wherein the power source is derived from the rotation  
2 of the propeller.
- 1 13. The heads-up display of claim 1, wherein the propeller blade is a first propeller blade,  
2 and further comprising a second plurality of light-emitting elements disposed on a side of

3 a second propeller blade of the propeller substantially facing at least one occupant of the  
4 aircraft and emitting light in accordance with the rotation of the propeller to produce at  
5 least one graphical image that appears to at least one occupant to be superimposed on the  
6 background.

1 14. The heads-up display of claim 13, wherein the at least one graphical image produced by  
2 the second plurality of light-emitting elements is redundant to the at least one graphical  
3 image produced by the plurality of light-emitting elements on the first propeller blade.

1 15. An aircraft, comprising:

2 a propeller having a plurality of propeller blades;

3 an array of light-emitting elements disposed on a side of one or more of the  
4 propeller blades; and

5 a graphics generator controlling illumination of one or more of the light-emitting  
6 elements in the array of light-emitting elements disposed on the side of one of the  
7 propeller blades in accordance with a rotation of the propeller, to produce a display of a  
8 graphical image.

1 16. The aircraft of claim 15, further comprising a processor obtaining information from  
2 aircraft instrumentation and sending a command based on the information to the graphics  
3 generator over a communication channel to control the display of the graphical image.

1 17. The aircraft of claim 16, wherein the communication channel is one of a wireless channel  
2 and a wired channel.

- 1 18. The aircraft of claim 15, further comprising a power generator generating from the  
2 rotation of the propeller a source of power that is supplied to the graphics generator.
- 1 19. A propeller, comprising:  
2 a propeller blade;  
3 a plurality of light-emitting elements disposed on a side of the propeller blade;  
4 and  
5 a spinner having a graphics generator in communication with the plurality of  
6 light-emitting elements to control illumination of one or more of the light-emitting  
7 elements in accordance with a rotation of the propeller.
- 1 20. The propeller of claim 19, further comprising a propeller-position sensor determining a  
2 current angular position of the propeller and communicating the current angular position  
3 to the graphics generator.
- 1 21. An apparatus for use in a craft having a rotating propeller, the apparatus comprising:  
2 a light source disposed on a side of a blade of the propeller;  
3 means for determining a current rotational position of the propeller; and  
4 means for controlling illumination of the light source based on the current  
5 rotational position of the propeller.
- 1 22. The apparatus of claim 21, further comprising means for generating power from the  
2 rotation of the propeller and providing the generated power to the means for controlling  
3 illumination of the light source.

1   23.    A method of producing a heads-up display for an aircraft with a rotating propeller, the  
2           method comprising:

3                 providing a plurality of light-emitting elements on a side of a propeller blade;

4                 determining a current rotational position of the propeller; and

5                 controlling illumination of the plurality of the light-emitting elements based on  
6           the current rotational position of the propeller.

1   24.    The method of claim 23, further comprising obtaining information from instrumentation  
2           of the aircraft, and wherein the step of controlling illumination causes display of a  
3           graphical image based on the obtained information during the rotation of the propeller.